

REMARKS/ARGUMENTS

The specification has been conformed to correspond to the preferred format for U.S. patent applications as required in the Office Action, and a Substitute Specification and Comparison Copy are submitted herewith.

Claims 1-8 and 11-13 are pending in this application. Claims 9 and 10 have been canceled.

Applicant notes with appreciation the substantive allowability of claim 7. Applicants also note that claim 4 was not rejected on formal grounds or over the prior art and therefore understand that claim 4 is also allowable over the prior art.

Claim 6 was rejected under Section 112 as being incomplete and omitting structural cooperative relationships of the elements. Claim 6 has been revised, and applicants submit it is now complete and sets forth the structural relationship of the recited elements. Applicants therefore request the retraction of the Section 112 rejection.

All claims were primarily rejected over Nakane (4,314,972) for anticipation (claims 1-3 and 5) or obviousness (claims 5 and 8).

The present invention is directed to catalytic reactions in which the catalyst remains dry, that is, does not become wetted by a liquid such as water. Such catalytic reactions are carried out in a first region (K in the specification and the originally submitted claims) on a first packing, and the substance exchange between the liquid and the gaseous phase containing vapor is carried out in a second region holding a second packing for compensating substance concentrations, as is discussed in paragraph 0004 of the Substitute Specification.

To prevent the catalyst in the first region from being wetted by liquid flowing through the column, the present application teaches:

The two regions A and K are screened off from one another in such a manner that no liquid drops can pass from A to K. Droplets of this kind would on the one hand impair the efficiency of the catalysis in K; on the other hand copper would be transported by

the droplets, which would contaminate the catalyst and thus reduce its reactivity. (paragraph 0018 of the Substitute Specification)

This is accomplished by arranging a connecting region C between the regions K and A so that the flow of the vaporized liquid substance passes upwardly through region K, downwardly through connection region C, and then upwardly again through region A. The liquid, however, flows only downwardly through the column under the force of gravity and never enters the connection region K, as is discussed in paragraph 0016, and as is shown in Fig. 2 of this application. Fig. 2 illustrates how the liquid flows gravitationally downwardly from an upper region A past collector 5 at the bottom of region A siphon drain 50, in addition to permitting the gravitational downward flow of the liquid, and prevents gas from flowing from a lower region A directly to the adjacent upper region A. Fig. 2 also illustrates the gaseous flow from a lower region A past region K and connection C to the lower end of the upper region A.

In contrast to the present invention, Nakane has a column 31 in which the entire cross-section of the column is occupied by the vapor-water contact bed 32 and the catalytic reaction region 33. As a result, bed 32 and region 33 are not horizontally spaced apart as required by the independent claims. Instead, they are located vertically above one another with alternating beds 32 and catalytic regions 33.

As is shown by Fig. 3 of Nakane, to prevent downwardly flowing water from contacting the catalytic reaction region, Nakane requires a complicated bubble cap plate “consisting of a horizontal plate 38 and a plurality of capped pipes 35, which rise from the horizontal plate. Then, the water flows along the horizontal plate 38 and through a vertical water channel 36, and the water reaches a water-distributor 34” (Column 4, lines 56-60).

Independent claim 1 is limited, amongst others, to “the regions K and A being horizontally offset from each other, and a liquid flow channel in fluid connection with region A directing the gravitational flow of the liquid substance through the modules and preventing the liquid substance from flowing through the region K”.

Contrary to these limitations in claim 1, Nakane discloses to arrange the corresponding regions vertically on top of each other and contains no suggestion that they should be horizontally offset. For this reason alone, Nakane does not anticipate claim 1.

Nakane also does not disclose or in any form suggest a fluid connection between the respective contact beds 32, which correspond to regions A, so that the gravitationally downwardly flowing water is prevented from flowing through the catalyst bed. For this additional reason, Nakane does not anticipate claim 1.

New independent claims 11 and 13 are allowable for the same reasons why claim 1 is allowable. Claim 11 recites in relevant parts that the column has a plurality of alternating first and second regions which are horizontally offset relative to each other, are in flow connection, and permit the gaseous substance to flow serially through the alternating first and second regions. Claim 11 further requires a flow diverter at a lower end of each second region for gravitationally flowing the liquid substance from one second region to the next second region and bypassing the first region.

For the reasons discussed above, Nakane contains no disclosure or suggestion to horizontally offset first and second regions. Moreover, Nakane also contains no suggestion to provide a simple flow channel which directs the water from one bed to the next bed 32' while preventing the water from flowing through catalytic reaction region 33. Instead, Nakane discloses to provide a complicated and therefore costly collection plate and installing multiple riser pipes with capped ends on top of perforated plates. For these additional reasons, Nakane does not anticipate claim 11.

New independent claim 13 recites amongst others that "the first and second regions [are] horizontally offset relative to each other", which is not disclosed or suggested by Nakane.

For this reason alone, claim 13 is not anticipated by Nakane.

Claim 13 further requires "a gas flow connection extending in a downwardly sloping direction from the outlet of the first region to the outlet of the second region permitting

the liquid in its vapor state to flow in a generally downward direction from the outlet of the first region to the outlet of the second region" Nakane does not disclose or suggest such an arrangement. For this additional reason, claim 13 is allowable over Nakane.

As demonstrated above, independent claims 1, 11 and 13 are not anticipated by Nakane.


Dependent claims 2-8 and 13 are directed to detailed features of the present invention which are independently allowable over the prior art in general and Nakane in particular, as has been recognized by the allowance of claim 7 and no rejection of claim 4 over the prior art. These claims are further allowable because they depend from an allowable parent claim.

CONCLUSION

In view of the foregoing, applicants submit that this application is in condition for allowance, and a corresponding notification to that effect at an early date is requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (415) 576-0200.

Respectfully submitted,


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